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August 25, 2015

Ms. Deborah Butler
Contracting Officer
U.S. Environmental Protection Agency
290 Broadway - 27th Floor
New York NY 10007-1866

REFERENCE: EPA Contract No.: EP-W-09-002
Work Assignment No. 060-RICO-02MV

DOCUMENT NO.: 3323-060-02577
Revision 00

SUBJECT: Acceptance of Referenced Work Assignment
Pierson's Creek Site
Remedial Investigation/ Feasibility Study
Newark, New Jersey

Dear Ms. Butler:

CDM Federal Programs Corporation (CDM Smith) is pleased to return one copy of the subject Work Assignment, which has been accepted on behalf of CDM Smith by Jeanne Litwin, Program Manager.

Please call me at (212) 785-9123 if you have any questions.

Sincerely,

CDM FEDERAL PROGRAMS CORPORATION

Frank Gellati
Finance and Administration Manager

cc: J. Litwin, CDM Smith
E. Leonard, CDM Smith
A. McKenna, CDM Smith
Region 2 RAC2 Document Control



624152



United States Environmental Protection Agency
Region 2 - New York

Work Assignment

Work Assignment Number
060-RICO-02MV☒ Original ☐ Amendment Number:Contract Number
EP-W-09-002Contract Period
Base Option Period Number 1 XTitle of Work Assignment
RI/FS for Pierson's Creek Site, Newark, New JerseyContractor
CDM Federal Programs CorporationSpecify Section and Paragraph of Contract SOW
III.A, Remedial Investigation/Feasibility StudyPurpose: ☒ Work Assignment Initiation ☐ Work Assignment Close-Out
☐ Work Assignment Amendment ☒ Incremental Funding
☐ Work Plan ApprovalPeriod of Performance
From: 08/21/15 To: 03/31/16Comments:
See page 2 for a description of this work assignment.☒ Superfund

Accounting and Appropriation Data

☐ Non-Superfund

Line	DC (Max 6)	Budget/FYs (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class	Amount	(Dollars)	(Cents)	Site/Project (Max 8)	Cost Org/Code (Max 7)
1											
2											
3											
4											
5											

Authorized Work Assignment Ceiling

Contract Period: Cost/Fee LOE
Previously Approved \$0.00 0

This Action \$50,000.00 (b) (4)

Total \$50,000.00 (b) (4)

Work Plan / Cost Estimate Approvals

Contractor WP Dated: Cost/Fee: LOE:

Cumulative Approved: 08/21/15 Cost/Fee: \$50,000.00 LOE: (b) (4)

Work Assignment Manager

PAMELA N. TAMES

Branch/Mail Code ERRD-NYRB-CNYRS

Phone Number (212) 637-4255

Fax Number

(Signature)

(Date)

Project Officer

HELEN H. ENG

Branch/Mail Code ERRD-PSB-CMS

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(Signature)

(Date)

Other Agency Official

Branch/Mail Code

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(Date)

Contracting Officer

DEBORAH C. BUTLER

AUG 21 2015

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Phone Number (212) 637-3367

Fax Number

(Signature)

(Date)

Contractor Acknowledgment of Receipt and Acceptance of Work Assignment (Signature and Title)

Date

RI/FS for Pierson's Creek Site, Newark, New Jersey

Contract: EP-W-09-002, Work Assignment: 060-RICO-02MV

Summary Information

Title: RI/FS for Pierson's Creek Site, Newark, New Jersey
Period of Performance: From: 08/21/15
To: 03/31/16
Issue Date: 08/21/15
Total Funding: \$50,000.00

Description of Work Assignment

This work assignment covers the performance of a remedial investigation/feasibility study for the Pierson's Creek site, Newark, New Jersey. The contractor shall perform the requirements of this work assignment in accordance with the attached statement of work. The completion date of the period of performance for this assignment is March 31, 2016.

The contractor shall participate in a scoping meeting with the EPA work assignment manager, project officer and contracting officer before beginning preparation of a draft work plan and budget for this assignment. EPA will hold this meeting within 30 calendar days after the work assignment issue date. The interim budget and expenditure limit cover initial project planning activities under Subtasks 1.1 through 1.6 and 1.10, as described in the statement of work. Under Subtask 1.4, the contractor shall prepare a draft RI/FS work plan covering all requirements of the statement of work; the contractor's draft work plan budget shall cover only the requirements of Subtasks 1.1 through 1.12. The contractor is not authorized to perform any additional subtasks under Task 1 at this time.

An interim budget and expenditure limit of (b) (4) PLOE hours and \$50,000 have been established for performance of the subtasks authorized under this work assignment, covering activities under these subtasks through the negotiation and approval of a final work plan and a final budget for Subtasks 1.1 through 1.12. The contractor may proceed with these activities in accordance with paragraphs (d) through (f) of Clause B.4. In accordance with paragraph (g) of Clause B.4, the contractor shall not exceed this expenditure limit under any circumstances without the prior written authorization of the contracting officer. The contractor shall also comply with the requirements of Clause B.9, "Special Limitation of Cost Provision for Work Assignments."

Work Assignment Manager

U.S. EPA - Region 2
ATTN: Pamela Tames
290 Broadway, 20th Floor
New York, NY 10007-1866

Mail Code: ERRD-NYRB-CNYRS
Phone Number: (212) 637-4255
E-Mail Address: tames.pam@epa.gov

Interim Budget/Expenditure Limit

Category	POP	
Level of Effort	Opt Pd.	(b) (4)
Estimated Cost	Opt Pd.	(b) (4)
Fixed Fee	Opt Pd.	
Total	Opt Pd.	\$50,000.00

RI/FS for Pierson's Creek Site, Newark, New Jersey

Contract: EP-W-09-002, Work Assignment: 060-RICO-02MV

Attachment

Attachment Name

Statement of Work for Remedial Investigation/Feasibility Study, Pierson's Creek Site,
Newark, New Jersey

**STATEMENT OF WORK
REMEDIAL INVESTIGATION/FEASIBILITY STUDY
PIERSON'S CREEK SITE
NEWARK, NEW JERSEY**

Introduction

This statement of work describes the Government's requirements for performance of a Remedial Investigation and Feasibility Study (RI/FS) to investigate the overall nature and extent of contamination and develop remedial alternatives for the Pierson's Creek Site, Newark, New Jersey, pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended (CERCLA) and the Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA (EPA 540/G-89/004, October 1998).

The Remedial Investigation will characterize the nature and extent of the risks associated with the contamination at the site, and includes (1) collection of data and information necessary to characterize the nature and extent of contamination at the site and assess the risk to human health and the environment, and (2) a determination of whether the contamination presents a significant risk to human health or the environment. The Feasibility Study will develop and analyze a range of remedial action alternatives through the application of established evaluation criteria, to facilitate the selection of the remedy.

Site Description

Pierson's Creek is an approximately 1.5-mile, man-made ditch located in a heavily industrialized section of Newark, New Jersey. The creek has been used as an urban stormwater drainage structure for more than 100 years, and it continues to be a component of the City of Newark's stormwater management system. Historically (including at the time of mercury releases), Pierson's Creek surfaced from a 36-inch stormwater culvert just to the north of the Troy Chemical property and flowed in the concrete channel that bisects the Troy facility; an unnamed, intermittent tributary flowed along the eastern property boundary and joined Pierson's Creek just south of the facility. Due to a drainage improvement project completed in 2007, the perennial portion of Pierson's Creek now begins just south of the Troy Chemical facility, where it receives stormwater runoff from a large culvert as well as the concrete channel and east ditch on the Troy property.

Pierson's Creek flows from the Troy Chemical facility through a series of open channels and culverts, in a general south-southwesterly direction for approximately 1.5 miles to the Port Newark Channel portion of Newark Bay. The Creek exhibits signs of tidal influence from the bay, including water level fluctuations and flow reversal. Moving from Troy Chemical in the north to south, the creek flows through the former Red Star property (currently occupied by Continental Hardware), the vacant former Engelhard property, Conrail's Oak Island rail yard, and private parking lots built on a former landfill within the Port of Newark. The creek flows through these properties for approximately 1 mile before being routed through culverts beneath Interstate 78, Newark International Airport, and New Jersey Turnpike.

Newark Bay is part of the New York-New Jersey Harbor Estuary, which also includes Upper New York Bay, Lower New York Bay, and Raritan Bay; the channels that connect the bays, including Arthur Kill/Pratt Creek, Kill Van Kull, and The Narrows; and the tidal portions of the Hackensack River, Passaic River, and other rivers. The surface water migration pathway for the Pierson's Creek site extends throughout the coastal tidal waters of Newark Bay, Arthur Kill, Kill Van Kull, Upper New York Bay, The Narrows, and into Lower New York Bay, in a series of arcs through the bays and lines through the channels.

Investigations by Troy Chemical, NJDEP, and EPA have indicated significant increases in sediment mercury concentrations at and downstream of the facility compared to upstream sediment concentrations, as recently as 2010. In July 1979, EPA collected a sediment sample from Pierson's Creek just downstream of the mercury wastewater treatment system, and reported a mercury concentration of 22,400 milligrams per kilogram (mg/kg), compared to upstream concentrations of 140 and 191 mg/kg; EPA also reported mercury concentrations above background for

samples collected downstream of the facility. The same report indicates a significant increase in water concentrations for benzene, which was a raw material at the Troy Chemical facility.

EPA conducted an investigation of Pierson's Creek in October 2012, which confirmed the observed release of mercury to the creek sediments. Mercury was detected in sediment samples collected throughout the accessible portions of the creek, and a site-attributable observed release is documented for a distance of approximately 0.25 mile downstream of the Troy facility. The affected area includes 0.15 mile of wetland frontage.

Pursuant to Section 105(a) of CERCLA, 42 U.S.C. § 9605(a), EPA placed the site on the National Priorities List, set forth at 40 C.F.R. Part 300, Appendix B, by publication in the Federal Register on September 16, 2014 (71 Fed. Reg. 56399).

A number of metals which are hazardous substances under CERCLA, including arsenic, copper, lead, mercury, silver, and zinc, were detected at the site in the creek sediment and adjacent soils, at greatly elevated concentrations.

Aroclor 1260 (PCB-1260), which has also been found at the site, is a hazardous substance under Section 101(14) of CERCLA, 42 U.S.C. § 9601(14), and is listed at 40 C.F.R. 302.4.

Exposure to the various hazardous substances present at the site by direct contact, ingestion, or inhalation can cause a variety of adverse human health effects.

Site History

The Troy Chemical facility discharged its mercury-bearing wastewaters directly to Pierson's Creek without treatment until 1965, when the facility's mercury pretreatment system was installed at the edge of the creek. Discharges of mercury-bearing wastewaters to Pierson's Creek continued from 1965 to 1976, even after the utilization of a sulfide precipitation process in the pretreatment system. In 1976, the facility connected to the Passaic Valley Sewerage Commission (PVSC) sewer system, and began diverting wastewater from the mercury pretreatment system to the facility waste water treatment plant (WWTP), where wastewaters were treated by settling, removal of suspended solids and oil, and neutralization before subsequent discharge to the PVSC system. Even these additional levels of treatment at the WWTP did not remove all mercury from the process wastewater; the mercury contribution to PVSC as tested in 1979 was calculated to be approximately 327 pounds per day, and the facility discharged an average of more than 30,000 gallons per day of mercury-bearing wastewater to the PVSC sewer system for a 91-day period in 1986. The facility reported that it ceased the production of mercury-containing products that discharged to the sewer effluent as of February 1, 1987.

EPA issued a notice letter to Troy Chemical on July 13, 2015.

Other properties which may have discharged contaminants to Pierson's Creek include the former Prentiss Drug & Chemical Co. property, the former Albert Steel Drum Co. property and the former Engelhard Corp. property now owned by 429 Delancy Associates LLC. Site data has been received from 429 Delancy Associates LLC and is anticipated from Troy Chemical and other parties. This data must be reviewed and evaluated for data gaps.

Purpose

The purpose of this statement of work (SOW) is to describe the requirements for conducting a Remedial Investigation/Feasibility Study (RI/FS) to select a remedy to eliminate, reduce, or control risks to human health and the environment at the Pierson's Creek site. This SOW is designed to provide the framework for conducting the RI/FS activities at the site. The objective of this RI/FS is to review and evaluate the studies and investigations performed at the site to date, determine the minimum amount of sampling data necessary to complete characterization of the site and support the selection of an approach for site remediation, and to use this data in support of a Record of Decision (ROD). The estimated period of performance for completion of this work assignment is twenty-six months.

General Requirements

The contractor shall perform this RI/FS in accordance with this statement of work and all other relevant guidance used by EPA in conducting a RI/FS. The contractor shall furnish all necessary and appropriate personnel, materials, and services needed for, or incidental to, performing and completing the RI/FS. In all cases, the contractor shall use the most recently issued guidance.

Attachment 1 of this SOW is a summary and prospective schedule for submittal of the major deliverables. A final schedule for submittal of these deliverables will be established as part of the approved work plan for this RI/FS.

EPA will monitor and oversee contractor activities throughout the RI/FS. EPA will review all deliverables prior to acceptance to determine whether the performance requirements of this work assignment have been met, and to assess the likelihood that the RI/FS will achieve its goals. Acceptance of deliverables by EPA does not relieve the contractor of responsibility for the adequacy of the deliverables in accordance with contract requirements.

The contractor shall communicate with the Work Assignment Manager (WAM) at least once a week, either in face-to-face meetings or through conference calls. The contractor shall notify EPA when 75 percent of the expenditure limit has been expended, and provide a project estimate at completion, in accordance with Clause B.9, "Special Limitation of Cost Provision for Work Assignments."

Green Remediation

"Green Remediation" is the practice of considering all environmental effects of the implementation of a remedy and incorporating options to maximize the net environmental benefit of cleanup actions. In accordance with EPA's strategic plan for compliance and environmental stewardship, the Agency strives for cleanup programs that use natural resources and energy efficiently, reduce negative impacts on the environment, minimize or eliminate pollution at its source, and reduce waste to the maximum extent possible. The EPA Region 2 Superfund program supports the adoption of "green site assessment and remediation," which is defined as the practice of considering all environmental impacts of studies, selection and implementation of a given remedy, and incorporating strategies to maximize the net environmental benefit of cleanup actions (see <http://www.clu-in.org/greenremediation>).

On March 17, 2009, Region 2 established a "Clean & Green" policy to enhance the environmental benefits of Superfund cleanups by promoting technologies and practices that are sustainable. This policy applies to all Superfund cleanup projects, and is available at [http://www.epa.gov/region02/superfund/green remediation/policy.html](http://www.epa.gov/region02/superfund/green%20remediation/policy.html). Region 2's "Clean and Green" policy" calls for the contractor, at a minimum, to purchase 100 percent of the electricity for this project from renewable sources and use clean diesel fuels and technologies during the performance of this work assignment. Under this policy, certain green remediation technologies will serve as touchstones for Region 2 response actions. The Region 2 "touchstone practices" include:

- Use of 100% of electricity from renewable sources
- Clean diesel fuels and technologies
- Methane capture at landfill sites
- Material reuse, reduction or recycling
 - Industrial materials reuse or recycling within regulatory requirements
 - Concrete made with Coal Combustion Products (CCP)
 - Construction and demolition materials
 - Recycle and reuse of organic materials generated on site
- Capture geothermal energy with pump and treat remediation systems to heat/cool structures

Green remediation objectives will be implemented by planning field activities that minimize fuel usage and impact to the environment. Planning that can minimize environmental impact includes measures that:

- Minimize number of field mobilizations
- Use ultra-low sulfur diesel or fuel-grade biodiesel as fuel (e.g. drilling equipment)

- Use non-phosphate detergents for decontamination
- Schedule sampling to minimize shipping
- Use of *in-situ* treatment and natural degradation processes to minimize energy usage and generation of greenhouse gases (GHG)

To the extent practicable, the contractor shall explore and implement green remediation strategies and applications in the performance of the requirements of this work assignment to maximize sustainability, reduce energy and water usage, promote carbon neutrality, promote industrial materials reuse and recycling, and protect and preserve land resources. The contractor shall present green remediation options and approaches in its work plans, provide cost analyses for these options in its work plan budgets, maintain records of “green-related” activities, and report this information to EPA in its monthly progress reports or as requested by the Project Officer.

The following guidance documents and references provide additional information regarding the implementation of “Green Remediation” practices:

- Attachment 2, “Green Remediation Practices”
- Attachment 3, Region 2 “Green Site Assessment and Remediation Checklist “
- Federal Acquisition Regulation, Part 23, “Environment, Energy and Water Efficiency, Renewable Energy Technologies, Occupational Safety, and Drug-Free Workplace:” FAR Subparts 23.2, 23.4, and 23.7 (see <http://www.arnet.gov/far/05-23-1/html/FARTOCP23.html>)
- Executive Order 13423, “Strengthening Federal Environmental, Energy, and Transportation Management” (January 2007) (see <http://www.epa.gov/oaintrnt/practices/eo13423.htm>)

Laboratory Accreditation/Certification Requirements

All environmental and analytical laboratories used by the contractor under this work assignment must be currently certified or accredited for the matrices and analyses to be conducted. This certification or accreditation must be granted by one of the following accreditation programs: the National Environmental Laboratory Accreditation Program (NELAP); the American Association for Laboratory Accreditation (AALA); another organization that accredits environmental data operations to an international consensus standard and is acceptable to the U.S. Environmental Protection Agency; or the subcontract laboratory is currently participating in the EPA Contract Laboratory Program. This certification or accreditation must be valid at the time of issuance of this work assignment, and the subcontract laboratory must maintain it through the duration of the work assignment period of performance.

If the subcontract laboratory’s certification or accreditation is suspended or revoked at any time during the period of performance, the contractor must notify the EPA Project Officer immediately, in order to ensure that any potential effect on the performance of this work assignment is promptly and properly resolved. If certification or accreditation is not available for a particular field of analysis, the contractor shall contact the Project Officer prior to performing this analysis, to request acceptance of an alternative demonstration of laboratory qualifications. The contractor shall also demonstrate the laboratory’s maintenance of these qualifications periodically through the duration of the work assignment performance period, as requested by the Project Officer.

Electronic Data Deliverable (EDD) Requirements

Region 2 has adopted the standardized electronic data deliverable (EDD) format in order to streamline the electronic submittal of environmental sampling data. The EDD format is required for all new and historic data submitted to the Region. The contractor shall provide electronic submittal of field sampling and laboratory analytical results, geologic data, and well location data in accordance with Region 2’s policies, guidelines, and formats.

Region 2's "Comprehensive Electronic Data Deliverable Specification Manual 3.0" (June 2015) explains the systematic implementation of EDD within Region 2, and provides detailed instructions of data preparation and identification of data fields required for data submissions. Additional Region 2 EDD guidance and requirements documents, including the "Electronic Data Deliverables Valid Values Reference Manual" (June 2015), the "Electronic Data Deliverable (EDD) Basic Manual for Historic Electronic Data" (Version 4.0, June 2015), the "Standalone EQUIS Data Processor User Guide," the "CLP EDD Conversion Tool Manual" and EDD templates, can be found at <http://www.epa.gov/region02/superfund/medd.htm>.

EPA Primary Contact

The primary contact for this work assignment is Pamela Tames, the Work Assignment Manager (WAM). She can be reached at (212) 637-4255, by telefax at (212) 637-3966 or by email at tames.pam@epa.gov. The secondary contact is Helen Eng, the Project Officer. She can be reached at (212) 637-4348 or by email at eng.helen@epa.gov.

Record-Keeping Requirements

The contractor shall maintain all technical and financial records for this RI/FS work assignment in accordance with the requirements of this contract and the technical direction of the EPA WAM. These technical and financial records must be in sufficient detail to support decisions made during this RI/FS as well as cost recovery actions. The WAM may periodically audit the site files and record-keeping procedures. At the completion of this work assignment, the contractor shall submit one copy of the major deliverables in electronic format to the EPA WAM, with one copy to the EPA Records Manager, pursuant to the requirements of Clause D.1, "Electronic Submission of Deliverables."

Project Closeout

At the completion of this work assignment, the contractor shall perform all necessary project closeout activities as specified in the contract. These activities shall include closing out any subcontracts, consolidation, organizing and indexing project records and files, and providing a technical and financial closeout report to EPA. The contractor shall report its final costs shall be reported to EPA in electronic format, broken down by cost element for each subtask of the Work Breakdown Structure (WBS) identified in this SOW.

Task 1 Project Planning and Support

1.1 Project Administration

The contractor shall provide the following project administration support in the performance of this work assignment:

Contractor site manager activities under project administration shall include:

- Preparation of the technical monthly report
- Review of weekly financial reports
- Review and update project schedule
- Weekly communication with EPA WAM
- Preparation of staffing plans

Program support personnel activities under project administration shall include:

- Review of work assignment technical and financial/budget status
- Preparation of status reports for the monthly progress report
- Technical resource management
- Respond to questions from the EPA PO and CO
- Preparation of monthly invoices

1.2 Scoping Meeting

The contractor shall attend a scoping meeting covering the requirements of this RI/FS. This meeting will be held at the EPA Region 2 office in New York, within 30 calendar days after the issuance of this WA. The contractor shall contact the WAM within 5 calendar days after receipt of this WA to schedule the scoping meeting. The contractor shall prepare meeting minutes, which shall include the contractor's understanding of all agreements reached and any issues requiring resolution, for review by the WAM, PO and CO.

1.3 Conduct Site Visit

The contractor shall conduct a site visit during the project planning phase to develop a basic understanding of the site for performance of the requirements of this RI/FS.

1.4 Prepare Draft Work Plan and Budget

The contractor shall prepare and submit a draft RI/FS work plan and budget in accordance with contract requirements. The contractor shall use information from the appropriate EPA guidance referenced in this SOW and technical direction provided by the EPA WAM as the basis for preparing the work plan and budget. General requirements for preparation of work plans and work plan budgets are described in Section 8.0 of Attachment B, "Reports of Work."

The RI/FS work plan shall include a comprehensive description of project tasks, the procedures to accomplish them, project documentation, and a proposed project schedule. The contractor shall use the approved quality assurance/quality control (QA/QC) systems and procedures to assure that the work plan and other deliverables are of professional quality. The work plan shall include the following:

- Identification of RI/FS project elements including project planning and activity reporting, field sampling and analysis, and treatability study activities. The contractor shall implement a detailed work breakdown structure for this RI/FS in accordance with the work breakdown structure in this statement of work.
- The contractor's technical approach to each task to be performed, including a detailed description of each task, the assumptions used, any information to be produced during and at the conclusion of each task, and a description of the work products that will be submitted to EPA. Information shall be presented in a sequence consistent with the work breakdown structure in this SOW.
- A proposed schedule with specific dates for completion of each required activity and submission of each deliverable required by the SOW. This schedule shall also include information regarding timing, initiation, and completion of all critical path milestones for each activity and deliverable, and the anticipated review time for EPA.
- Address site access, security, contingency procedures, management responsibilities, and how investigation-derived wastes are to be stored and disposed of.
- A list of key contractor personnel providing support for this work assignment.

In conjunction with preparation of the draft work plan, the contractor shall prepare and submit a draft work plan budget. This work plan budget shall follow the work breakdown structure for this assignment as indicated in the statement of work, and shall contain a detailed cost breakdown, by subtask, of the direct labor costs, subcontract costs, "other direct" costs, projected base fee and award fee pool, and any additional specific cost elements required for performance of each of the subtasks under this statement of work. "Other direct" costs shall be broken down into individual cost categories as required for this work assignment, based on the specific cost categories negotiated for this contract. The work plan budget shall contain a detailed rationale describing the contractor's assumptions for estimating the level of effort (including professional/technical levels and skill mix), subcontract amounts, and "other direct" cost amounts for each subtask under this SOW.

1.5 Negotiate and Prepare Final Work Plan and Budget

The contractor shall participate in a work plan budget negotiation meeting at the Region 2 New York office in person or by teleconference. EPA and the contractor will discuss and negotiate the costs required to perform the tasks described in the final work plan implementing the requirements of this SOW. The contractor shall submit a final work plan incorporating all EPA comments and a final work plan budget incorporating the agreements made in the negotiations. The final work plan budget shall include a summary of the negotiations. The contractor shall submit the final work plan and budget in both hardcopy and electronic formats.

1.6 Evaluate Existing Data and Documents

The contractor shall research and review existing background information and documentation pertaining to the site, including all studies and investigations performed at the site, as provided or identified by the EPA WAM. As part of this effort, the contractor shall evaluate the following documents:

- EPA files and records
- Files and records from the U.S. Geological Survey, U.S. Army Corps of Engineers, and other federal sources
- Files and records from the State of New Jersey
- PRP files and records

1.7 Quality Assurance Project Plan

The contractor shall prepare a Quality Assurance Project Plan (QAPP) in accordance with the “EPA Requirements for Quality Assurance Project Plans (EPA QA/R-5)” (EPA/240/B-01/003, March 2001; reissued May 2006), the “Uniform Federal Policy for Quality Assurance Project Plans” (EPA-505-B-04-900A, March 2005), current EPA Region 2 RAC QAPP guidance and procedures, and the contractor’s current approved quality management plan for this contract. The contractor shall submit the QAPP as an appendix to the RI/FS work plan to facilitate review and approval.

The QAPP is a comprehensive document combining information previously provided in two separate documents, the Quality Assurance Project Plan (QAPP) and the Sampling and Analysis Plan (SAMP). The QAPP shall describe the project objectives and organization, functional activities, and quality assurance/quality control (QA/QC) protocols that will be used to achieve the desired Data Quality Objectives (DQOs). The DQOs shall, at a minimum, reflect use of analytical methods for identifying and addressing contamination consistent with the levels for remedial action objectives identified in the National Contingency Plan.

In addition, the QAPP shall describe the number, type, and location of samples and type of analyses to be performed. The QAPP shall include sampling objectives, sample locations and frequency, sampling equipment and procedures, sample handling and analysis, and a breakdown of samples to be analyzed through the Contract Laboratory Program (CLP) and other sources, as well as the justification for these decisions. The QAPP shall consider the use of all existing data and shall justify the need for additional data whenever existing data will meet the same objective. The QAPP shall be written so that a field sampling team unfamiliar with the site would be able to gather the necessary samples and field information in accordance with EPA Region 2’s quality assurance requirements. The contractor shall document any required changes to the QAPP in a letter to the EPA WAM and QAO.

1.8 Health and Safety Plan

The contractor shall prepare a site-specific Health and Safety Plan (HASP) that specifies employee training, protective equipment, medical surveillance requirements, standard operating procedures and a contingency plan in accordance with 40 CFR 300.150 of the NCP and 29 CFR 1910.120 (l)(1) and (l)(2). The contractor shall submit the HASP as an appendix to the work plan to facilitate document review and approval.

1.9 Non-RAS Analysis (Optional)

At the direction of EPA, the contractor shall develop an EPA-approved laboratory quality assurance program that provides oversight of in-house and subcontracted laboratories through periodic performance evaluation sample analyses and/or on-site audits of operations, and prescribes a system of corrective actions to be implemented in cases where the laboratory's performance does not meet the standards of this program. This will include at a minimum:

- Prepare Laboratory Services Requests (including statements of work) for all non-RAS parameters. The Laboratory Services Requests shall include the following elements:
 - digestion/analytical methods
 - data deliverable requirements
 - quality control (QC) requirements
 - estimated number of samples
 - method restrictions and penalties for non-compliance
 - turnaround times
- Develop QC criteria for each parameter of the approved site-specific or contract-wide QAPP that will be incorporated into the Laboratory Service Request.
- The contractor shall comply with all applicable and appropriate requirements in the acquisition and management of subcontracts for analytical services, including the requirements, terms, and conditions of this contract; the subcontractor's corporate standard operating procedures; and the applicable requirements of the Federal Acquisition Regulation (FAR), Environmental Protection Agency Acquisition Regulation (EPAAR), and other pertinent Federal and Agency acquisition requirements.
- At the request of the EPA WAM, the contractor shall submit the Laboratory Services Requests for EPA review prior to solicitation of an analytical services subcontract.

1.10 Meetings

The contractor shall participate in progress meetings during the course of this work assignment. For budgeting purposes, the contractor shall assume that 8 meetings will be held, each with 2 people in attendance. The contractor shall submit minutes of each meeting within 5 calendar days, for review by the EPA WAM.

1.11 Subcontract Procurement

The contractor shall identify, solicit, and award the subcontracts necessary to perform the requirements of this statement of work. The contractor shall describe the subcontracts needed for support of the RI/FS activities as part of its work plan and budget. The contractor shall perform all subcontract procurement activities under this subtask.

1.12 Perform Subcontract Management

The contractor shall perform management and oversight of all subcontracts needed for RI/FS activities. The contractor shall institute procedures to monitor progress, and maintain systems and records to ensure that the work proceeds in accordance with the requirements of this work assignment and the contract. The contractor shall review and approve subcontractors' invoices and issue any necessary subcontract modifications.

1.13 Pathway Analysis Report

The contractor shall prepare a Pathway Analysis Report in accordance with the "*Risk Assessment Guidance for Superfund: Part D*," dated December 2001. The contractor shall submit the PAR after the draft work plan is approved; the specific schedule for submission of the PAR will be established as part of final work plan approval. EPA must review and approve the PAR prior to the contractor's submission of the draft risk assessment report.

The PAR shall describe the risk characterization process and how the risk assessment will be prepared, in order to allow the risk assessors to ensure that the proper guidance and methodologies are followed. This report shall contain all of the information necessary for a reviewer to understand how the risks at the site will be addressed, including the statistical treatment of the data, the methods for selection of the contaminants of potential concern (COPCs), the exposure pathways, receptors and parameters to be used, and the current toxicological values. The report shall include the RAGS, Part D Tables 1 through 6, as well as explanatory text based on all data collected. The PAR shall be completed after all data are collected, in accordance with the requirements of RAGS, Part D Tables 1 through 6. If the contractor recommends modeling, a description of the model and an explanation of the inputs and assumptions shall be included in the PAR so that their appropriateness can be determined (see also Subtask 6.3). The contractor shall provide the results of the PAR in the draft human health risk assessment under Subtask 7.1.

Task 2 Community Relations

This task covers technical support to be provided by the contractor during public meetings and availability sessions conducted under this work assignment. The contractor shall provide community relations support to EPA throughout this RI/FS assignment in accordance with the “*Superfund Community Involvement Handbook*” (EPA 540-K-05-003, April 2005).

2.1 Community Interviews

The contractor shall perform the following requirements under this subtask:

- *Community Interview Support.* The contractor shall review relevant background documents as provided by the EPA WAM, and shall provide technical support for the community interviews, as directed by the WAM. The WAM will conduct interviews with the appropriate governmental officials (federal, state, county, township, city), environmental groups, local broadcast and print media and any other relevant individuals or groups, either in person or by telephone.
- *Community Interview Questions.* The contractor shall prepare draft interview questions for review by the EPA WAM. The contractor shall prepare final interview questions incorporating all EPA review comments.

2.2 Community Involvement Plan

The contractor shall prepare a draft community involvement plan that presents an overview of the community's concerns and covers the following elements: 1) site background including location, description and history; 2) community overview including a community profile, concerns and involvement; 3) community involvement objectives and planned activities, with a proposed schedule for performance of these activities; 4) a mailing list of contacts and interested parties; 5) names and addresses of the information repositories and public meeting facility locations; 6) a list of acronyms; and 7) a glossary. The contractor shall submit the final community involvement plan incorporating all EPA review comments.

2.3 Public Meeting Support

The contractor shall perform the following activities in support of public meetings, availability sessions, and open houses under this work assignment:

- The contractor shall make reservations for a meeting space, per the technical direction of the EPA WAM.
- The contractor shall attend the public meeting, and prepare meeting summaries. For budgeting purposes, the contractor shall assume that EPA will hold one (1) public meeting.

- The contractor shall prepare draft visual aids in PowerPoint, as directed by the EPA WAM. For budgeting purposes, the contractor shall assume that 35 slides and 60 handouts will be required for each public meeting. The contractor shall prepare final visual aids incorporating all EPA comments.
- The contractor shall reserve a court reporter for the two public meeting as directed by the EPA WAM. The contractor shall provide a full-page original and a "four on one" page copy, along with an electronic version of the transcripts, with additional copies placed in the information repositories as required by the WAM.
- The contractor shall prepare and maintain a sign-in sheet for each public meeting. The contractor shall make use of the names provided on the sign-in updating the site mailing list (see Subtask 2.8).

2.4 Fact Sheet Preparation

The contractor shall prepare draft information letters, updates and fact sheets in accordance with the approved community relations plan for this site, as directed by the EPA WAM. For budgeting purposes, the contractor shall assume that one fact sheet for the public meeting will be prepared, 3 to 5 pages in length and with 4 illustrations. The contractor shall research, write, edit, design, layout, and photocopy the fact sheet. The contractor shall prepare the final fact sheet incorporating all EPA review comments. The contractor shall attach mailing labels to the final fact sheet copies before delivering them to EPA, who will be responsible for mailing.

2.5 Proposed Plan Support - *Not Applicable*

2.6 Public Notices

The contractor shall prepare newspaper announcements/public notices in the most widely-read local newspapers, in support of the two public meetings and the availability session. The contractor shall budget for the preparation of 3 newspaper advertisements in the most widely-read local newspapers, with each ad placed in a large area-wide newspaper and a small local newspaper.

2.7 Information Repositories - *Not Applicable*

2.8 Site Mailing List

The contractor shall prepare a mailing list for community relations activities at this site. For budgeting purposes, the contractor shall assume that the mailing list will contain approximately 80 entries and will be updated twice. At the request of the EPA WAM, the contractor shall provide an electronic copy of the mailing list and mailing labels for each mailing. EPA will do the actual mailing of any information to the community.

2.9 Responsiveness Summary Support

The contractor shall provide administrative and technical support for the site Responsiveness Summary. As directed by the EPA WAM, the contractor shall prepare a draft Responsiveness Summary compiling and summarizing comments received during the public comment period on the Proposed Plan. The contractor shall also prepare technical reviews and draft responses for selected technical comments, for EPA's review and use in preparing the formal responses. For budgeting purposes, the contractor shall assume receipt of 60 separate comments (including duplicates).

Task 3 Field Investigation

Data acquisition covers the collection of environmental samples and information required to support the RI/FS. The plans describing requirements for collection of the field data are described in Task 1. Data acquisition under this task begins with EPA's approval of the QAPP and ends with the demobilization of field personnel and equipment

from the site. The contractor shall perform the following field activities for data acquisition in accordance with the EPA-approved QAPP prepared under Task 1.

3.1 Site Reconnaissance

The contractor shall update site surveys covering property, boundary, utility rights-of-way, and topographic information. These surveys shall include the following activities as necessary for precise characterization of site features pertinent to the field investigation:

- Aerial photography and analysis
- Existing well development and establishment of sampling points
- On-site well sampling
- Surface water sampling
- Soil sampling
- Sediment sampling, (if necessary - see Subtask 3.3, Item v)
- *Photographic documentation.* The contractor shall take representative photographs to document the RI field activities and significant events and observations made during the RI/FS. These activities shall include contractor mobilization, collection of samples, ecological studies, treatability studies (if required), and demobilization. The contractor shall photograph these activities so that the photographs will serve as a clear record of the procedures required to carry out each activity. The contractor shall also store and maintain these photographs in an electronic format and submit them to EPA on disk. For each photograph, the contractor shall provide the time, date, location and a brief explanation of what is being photographed.

The contractor shall submit a monthly field activity report to the EPA WAM by electronic mail and in hardcopy.

3.2 Mobilization and Demobilization

The contractor shall provide the necessary personnel, equipment, and materials for mobilization and demobilization to and from the site.

Mobilization activities include:

- Site preparation
- Installation of utilities
- Lease of temporary facilities
- Establishment of health and safety zones
- Initial health and safety debriefing for all project team members

Demobilization activities include:

- Demobilization of field laboratory (if one was used)
- Decontamination and removal of equipment and temporary facilities
- Site restoration

3.3 Hydrogeological Assessment

The contractor shall perform the following activities under this subtask:

- i. Assessment of all existing monitoring wells and evaluation of their suitability, both conceptually and technically, for sampling required to characterize site contamination accurately and thoroughly for the RI.
- ii. Installation of additional monitoring wells as necessary to supplement existing monitoring wells for the performance of the RI (see Subtask 3.4).

iii. Groundwater elevation measurements.

iv. A surface water reconnaissance/evaluation to determine whether a surface water body could be potentially affected by contaminated groundwater or site runoff.

v. A groundwater and site runoff/surface water interaction evaluation, should the surface water reconnaissance/evaluation under Item “iv” indicate that a surface water body could be potentially affected by either contaminated groundwater or site runoff.

3.4 Soil Boring, Drilling, and Testing

The contractor shall install monitoring wells and perform soil borings as directed by EPA. The contractor shall record formation cuttings, type, and sorting and drilling rates during the boring and drilling activities. The contractor shall also prepare and maintain geophysical logs (gamma, resistivity, and caliper) for each boring. For budgeting purposes, the contractor shall assume that 10 borings will be performed at a depth of approximately 8 feet, and that 25 shallow borings will be performed at a depth of approximately 3 feet.

3.5 Environmental Sampling

The contractor shall perform the following activities under this subtask:

- Field screening
- Groundwater sampling
- Surface and subsurface soil sampling
- Soil boring/permeability sampling
- Surface water and sediment sampling
- Air monitoring sampling for health and safety
- Indoor air sampling for vapor intrusion, as necessary

3.6 Ecological Characterization

The contractor shall perform the following activities under this subtask:

- Habitat delineation/function and value assessment
- Benthic reconnaissance/community characterization, (if necessary - see Subtask 3.3, Item v)
- Biota sampling/population studies, (if necessary - see Subtask 3.3, Item v)
- Bioaccumulation studies, (if necessary - see Subtask 3.3, Item v)
- Sediment toxicity tests (if necessary - see Subtask 3.3, Item v)

Note: Implementation of these activities will depend on the results of the Screening-Level Ecological Risk Assessment (SLERA) that indicate a need to proceed to a Baseline Ecological Risk Assessment. (See *Ecological Risk Assessment Guidance for Superfund, Process for Designing and Conducting Ecological Risk Assessments [ERAGS]*, USEPA, 1997 [EPA/540-R-97-006] - Steps 1 and 2, and other requirements under Subtask 7.2.) For budgeting purposes, the contractor shall assume that these ecological characterization activities will be required, and address these requirements as part of its draft work plan and budget.

3.7 Geotechnical Survey - Not Applicable

3.8 Investigation - Derived Waste (IDW) Characterization and Disposal

The contractor shall characterize and dispose of investigation-derived wastes in accordance with local, Commonwealth, and Federal regulations as specified in the QAPP (reference the *Guide to Management of Investigation-Derived Wastes*, 9345.3-03FS [January 1992]).

Task 4 Sample Analysis

The contractor shall arrange for the analysis of environmental samples collected during Task 3. The contractor's work plan budget for this task shall include only the cost of the sample analysis. Costs for efforts associated with sample collection and shipment shall be included in Task 3, efforts associated with sample validation included in Task 5, and efforts associated with data evaluation included in Task 6. In accordance with the approved work plan and QAPP for this work assignment, the contractor shall analyze the samples as described in the following subtasks.

4.1 Innovative Methods/Field Screening Sample Analysis - *Not Applicable*

4.2 Analytical Services Provided via CLP, DESA or EPA-ERT

The contractor shall identify the number and types of samples as called for below. Analysis of these samples will be performed by Region 2 DESA, CLP, or ERT.

- Analyze groundwater samples
- Analyze surface water samples
- Analyze soil and sediment samples
- Analyze soil boring/permeability samples
- Analyze indoor air samples for vapor intrusion, as necessary

4.3 Non-Routine Analytical Services

The contractor shall perform the following types of sample analysis under this subtask:

- Analyze groundwater samples
- Analyze surface water samples
- Analyze soil and sediment samples
- Analyze soil boring/permeability samples
- Analyze indoor air samples
- Analyze soil characteristics and engineering properties to evaluate the feasibility of candidate remedial technologies for treatability studies and selection of remedial alternatives

Task 5 Analytical Support and Data Validation

The contractor shall arrange for the validation of environmental samples analyzed under Task 4. Sample validation under this task begins with the completion of the field sampling program and reservation of sample slots in the Contract Laboratory Program (CLP), and ends with the contractor's validation of the analytical data received from the laboratory. The contractor shall validate all analytical data, whether received from EPA laboratories, CLP laboratories or subcontracted laboratories.

The contractor shall ensure that all subcontracted laboratory analyses are performed in accordance with generally-accepted EPA methods, and shall submit all analytical data from subcontract laboratories to EPA in a CLP-deliverable format. The contractor shall perform the activities described in the following subtasks:

5.1 Prepare and Ship Samples

The contractor shall prepare and ship the analytical samples collected under Task 3 in accordance with the approved QAPP.

5.2 Sample Management

The contractor shall perform sample management, covering the following activities:

- Coordinate with the EPA Sample Management Office (SMO), the Region 2 Sample Control Coordinator (RSCC), the Division of Environmental Science and Assessment (DESA) and other applicable EPA sample management offices regarding analytical, data validation and quality assurance issues.
- Implement EPA-approved laboratory quality assurance program to provide oversight of in-house and subcontract laboratories. (**Note:** *This activity shall be performed only in the event that Subtask 1.9 is performed under this work assignment.*)
- Provide chain-of-custody, sample retention, and data storage functions in accordance with the approved contract-wide QAPP, quality management plan and contract requirements. The contractor shall ensure that accurate chain-of-custody procedures are implemented and carried out for sample tracking, protective sample packing is performed, and proper sample preservation techniques are used.

5.3 Data Validation

The contractor shall validate the data to ensure that the data and chain-of-custody are accurate and defensible. The contractor shall perform the following activities under this subtask:

- Review analysis results against validation criteria.
- Review the data and make a data usability determination.
- Provide a data validation report to the EPA WAM after all data have been validated.

Task 6 Data Evaluation

The contractor shall organize and evaluate existing data and data gathered during Tasks 3-5 that will be used later in the RI/FS effort. Data evaluation begins with the receipt of analytical data validated under Task 5, and ends with the submittal of the Data Evaluation Summary Report. The contractor shall perform the following activities under this task:

6.1 Data Usability Evaluation

The contractor shall evaluate the usability of the data, including any uncertainties associated with the data. If using statistical methods to evaluate the usability of the data, this shall be performed in accordance with the *Data Quality Assessment: A Reviewer's Guide* (EPA QA/G-9R EPA/240/B-06/002, February 2006). Section 5 of the UFP-QAPP Manual also provides information on what shall be included in the Data Evaluation Report.

6.2 Data Reduction, Tabulation, and Evaluation

The contractor shall evaluate, interpret, and tabulate data in an appropriate presentation format for final data tables. The following shall be used as general guidelines in the preparation of data for the RI report:

- Tables of analytical results should be organized in a logical manner such as by sample location number, sampling zone, or other logical format. Groundwater analytical results should be separated into groups based on the hydrogeologic framework, such as shallow aquifer upgradient, deep aquifer upgradient, shallow aquifer downgradient and deep aquifer downgradient. Well identification numbers within each set should be ordered according to whatever alphanumeric system is used for the well identification numbers. Surface/subsurface soil analyses should be separated according to site location or specific contaminant source and background areas. The contractor shall coordinate the table organization method with the EPA WAM.
- Analytical results should not be organized by laboratory identification numbers because these numbers do not correspond to those used on sample location maps. The sample location/well identification number

should always be used as the primary reference for the analytical results. The sample location number should also be indicated if the laboratory sample identification number is used.

- Analytical tables should indicate the sample collection dates.
- The detection limit should be indicated in instances where a parameter was not detected.
- Analytical results should be reported in the text, tables and figures using a consistent convention such as ug/l for groundwater analyses and mg/kg for soil analyses.
- The lead agency's protocol for eliminating field sample analytical results based on laboratory/field blank contamination results should be clearly explained.
- Discussion of approved sampling results should not be qualified by suggesting that a particular chemical is a common lab contaminant or was detected in the lab blank. If the reported result has passed QA/QC it should be considered valid. In cases where the chemical in question was known to have been used and/or disposed of on site, positively identified at high levels in other environmental media, and passes QA/QC protocols, the sampling results should not be questioned as being due to laboratory contaminants.
- Field equipment rinsate blank analysis results should be discussed in detail if decontamination solvents are believed to have contaminated field samples.

6.3 Modeling (Optional)

Note: *This subtask is an optional requirement. The contractor shall include a cost estimate for performance of this subtask as part of its work plan budget. In the event that EPA determines that performance of this subtask is necessary, a WA amendment will be issued to formally implement these requirements into this work assignment.*

The contractor shall evaluate the existing data collected under the field investigation and make an assessment of the need for modeling to complete an accurate characterization of the nature, extent, distribution and movement of site contamination. This evaluation will also cover the historical distribution and movement of site contamination (forensic modeling) to help identify potential source areas, utilizing the results of the chemical fingerprinting analysis. The contractor shall provide a technical memorandum to the EPA WAM summarizing the results of this evaluation and its recommendations concerning performance of modeling for this site. Based on its review of this technical memorandum, EPA will determine whether modeling will be conducted for this RI/FS, and will direct the contractor to perform a modeling effort if required.

6.4 Data Evaluation Report

The contractor shall evaluate and present results in a Data Evaluation Summary Report, to be submitted to the EPA WAM for review and approval. The report shall include an evaluation of the historical data, identify gaps that may be addressed as part of the RI, include a summary of data gathered as part of the field investigation, and identify data gaps for future investigations. If additional analytical data are needed or if significant data problems are identified during the evaluation, the contractor shall provide a separate memorandum describing these problems for review by the WAM.

Task 7 Assessment of Risk

The risk assessment will determine whether site contaminants pose a current of potential risk to human health and the environment in the absence of any remedial action, and will be used to determine whether remediation is necessary at the site, provide justification for performing a remedial action, and determine which exposure pathways need to be remediated. The contractor shall perform the risk assessment, addressing the contaminant identification, exposure assessment, toxicity assessment, and risk characterization, in accordance with the requirements of the following subtasks.

7.1 Baseline Risk Assessment (Human Health)

The contractor shall perform a Baseline Human Health Risk Assessment (HHRA) in accordance with the approach and parameters described in the approved Pathway Analysis Report (PAR) and the requirements of the “*Risk Assessment Guidance for Superfund (RAGS), Volume I – Human Health Evaluation Manual, Part A: Baseline Human Health Risk Assessment.*” (The requirements for the PAR are described in Subtask 1.13.) The PAR must be approved by EPA prior to the submission of the draft risk assessment report. The contractor shall incorporate EPA review comments on the PAR into the draft HHRA. The contractor shall use the most current toxicity values in preparing the HHRA.

Draft Baseline Human Health Risk Assessment Report: The contractor shall prepare a draft Baseline Human Health Risk Assessment report covering the following requirements:

- **Hazard Identification.** The contractor shall identify and describe the contaminants of potential concern (COPCs) based on their intrinsic toxicological properties.
- **Dose-Response Assessment.** The contractor shall select the contaminants of concern based on their intrinsic toxicological properties.
- **Characterization of Site and Potential Receptors.** The contractor shall identify and characterize human populations in the exposure pathways.
- **Exposure Assessment.** The exposure assessment shall identify the magnitude of actual or potential human exposures, the frequency and duration of these exposures, and the routes by which receptors are exposed. The exposure assessment shall include an evaluation of the likelihood of such exposures occurring and shall provide the basis for the development of acceptable exposure levels. In preparing the exposure assessment, the contractor shall develop reasonable maximum estimates and central tendencies of exposure (when appropriate) for both current and potential land use conditions at the site. The contractor shall clearly explain and justify its rationale for use of site-specific over default exposure factors.
- **Toxicity Assessment.** The contractor shall list all toxicity values (slope factors and reference doses) for the COPCs and the sources of the toxicity values, in accordance with EPA’s current toxicity hierarchy (see “*Human Health Toxicity Values in Superfund Risk Assessments,*” OSWER Directive 9285.7-53, December 5, 2003). The contractor shall submit chemicals without assigned toxicity values in Tiers 1 and 2 to EPA for determination of the appropriate value.
- **Risk Characterization.** During risk characterization, the contractor shall compare chemical-specific toxicity information, combined with quantitative and qualitative information from the exposure assessment, to measured levels of contaminant exposure and the levels predicted through environmental fate and transport modeling. These comparisons shall determine whether concentrations of contaminants at or near the site are affecting or could potentially affect human health. Based on these results, the contractor shall also address other concerns important to the risk characterization, such as a qualitative discussion of chemicals without toxicity data and how concentrations found on site relate to background concentrations.
- **Identification of Limitations/Uncertainties.** The contractor shall identify critical assumptions and uncertainties (e.g., background concentrations and conditions, modeling inputs, toxicity data, environmental data, and et al.) in the report.
- **Site Conceptual Model.** The contractor shall develop a conceptual model of the site based on the contaminant identification, exposure assessment, toxicity assessment, and risk characterization.

Final Baseline Human Health Risk Assessment Report: The contractor shall submit the final Baseline Human Health Risk Assessment Report incorporating all EPA review comments.

7.2 Baseline Risk Assessment - Ecological Risk Assessment

The contractor shall perform a Screening-Level Ecological Risk Assessment (SLERA) in accordance with current Superfund ecological risk assessment guidance (*Ecological Risk Assessment Guidance for Superfund, Process for Designing and Conducting Ecological Risk Assessments [ERAGS]*, EPA 540-R-97-006, June 1997). The contractor shall compare the maximum contaminant concentrations in each medium of concern to appropriate conservative ecotoxicity screening values (e.g., New Jersey Water Quality Standards and Guidance Values and EPA's Ambient Water Quality Criteria [AWQC]), and shall use conservative exposure estimates. EPA will review and approve the SLERA and determine whether a full Baseline Ecological Assessment is required.

At EPA's direction, the contractor shall perform a Baseline Ecological Risk Assessment in accordance with *Ecological Risk Assessment Guidance for Superfund, Process for Designing and Conducting Ecological Risk Assessments [ERAGS]*. The contractor shall evaluate and assess the risk to the environment posed by site contaminants. As part of this effort, the contractor shall perform the following activities:

Draft Ecological Risk Assessment Report. The contractor shall prepare a draft Ecological Risk Assessment Report which addresses the following:

- Hazard Identification (sources). The contractor shall review available information on the hazardous substances present at the site and identify the major contaminants of concern.
- Dose-Response Assessment. The contractor shall identify and select contaminants of concern based on their intrinsic toxicological properties.
- Characterization of Site and Potential Receptors. The contractor shall identify and characterize environmental exposure pathways.
- Select Chemicals, Indicator Species, and End Points. In preparing the assessment, the contractor shall select representative chemicals, indicator species (species that are especially sensitive to environmental contaminants), and end points on which to concentrate.
- Exposure Assessment. The exposure assessment shall identify the magnitude of actual or environmental exposures, the frequency and duration of these exposures, and the routes by which receptors are exposed. The exposure assessment shall include an evaluation of the likelihood of such exposures occurring and shall provide the basis for development of acceptable exposure levels. In preparing the exposure assessment, the contractor shall develop reasonable maximum estimates of exposure for both current and potential land use conditions at the site.
- Toxicity Assessment/Ecological Effects Assessment. The toxicity and ecological effects assessment shall address the types of adverse environmental effects associated with chemical exposures, the relationships between magnitude of exposure and adverse effects, and the related uncertainties for contaminant toxicity (e.g., weight of evidence for a chemical's carcinogenicity).
- Risk Characterization. As part of the risk characterization, the contractor shall compare chemical-specific toxicity information, combined with quantitative and qualitative information from the exposure assessment, to measured levels of contaminant exposure levels and the levels predicted through environmental fate and transport modeling. These comparisons shall determine whether concentrations of contaminants at or near the site are affecting or could potentially affect the environment.
- Identification of Limitations/Uncertainties. The contractor shall identify critical assumptions (e.g., background concentrations and conditions) and uncertainties in the report.
- Site Conceptual Model. The contractor shall develop a conceptual model of the site based on contaminant identification, exposure assessment, toxicity assessment, and risk characterization.

Final Ecological Risk Assessment Report: The contractor shall submit the final Ecological Risk Assessment Report incorporating all EPA review comments.

Task 8 Treatability Study and Pilot Testing

Remedial technologies that may be suitable to the site should be identified as early as possible to determine whether there is a need to conduct treatability studies to better estimate performance capabilities and costs. The treatability study will determine the suitability of remedial technologies to site conditions and problems. The three levels of treatability studies are laboratory screening, bench-scale testing, and pilot-scale testing. The laboratory screening is used to establish the validity of a technology to treat waste and is normally conducted during the Feasibility Study. Bench-scale testing is used to identify the performance of the technology specific to a type of waste for an operable unit; bench-scale tests are often conducted during the FS. Pilot-scale testing is used to provide quantitative performance, cost, and design information for remediation, and is typically performed during the RI/FS (see the “*Guide for Conducting Treatability Studies under CERCLA, Final*,” EPA/540/R-92/071A (October 1992).

8.1 Literature Search

The contractor shall research viable technologies that may be applicable to the contaminants of concern and the site conditions encountered. The contractor shall provide a technical memorandum to the EPA WAM summarizing the results of this literature research and assessing the need for additional treatability studies. As part of this document, the contractor shall submit a plan recommending performance of a treatability study at one of the above levels and identifying the types and specific goals of the study. The treatability study shall determine the suitability of remedial technologies to site conditions and problems. Based on its review of this technical memorandum, EPA will determine whether a bench test or pilot study will be conducted for this project, and will direct the contractor to prepare an addendum to the RI/FS work plan describing its detailed approach for performance of the treatability study, in accordance with the requirements described in Subtask 8.2 below.

Note: Subtasks 8.2 through 8.4 are optional requirements. In the event that EPA determines that performance of these subtasks are necessary, a WA amendment will be issued to implement these requirements into this work assignment.

8.2 Treatability Study Work Plan (Optional)

Upon implementation of this requirement, the contractor shall prepare a draft addendum to the RI/FS work plan and budget describing its approach for performance of the treatability study, prepare a final work plan addendum documenting the technical approach approved by EPA, negotiate the additional level of effort and costs required to accomplish the treatability study requirements, and prepare a final budget supplement incorporating the agreements reached during the negotiations.

The treatability study work plan addendum shall describe in detail the treatment process and how the proposed technology or vendor (if the technology is proprietary) will meet the performance standards for the site. The treatability study work plan addendum shall address how the proposed technology or vendor of the technology will meet all discharge or disposal requirements for any and all treated material, air, water, and expected effluents. In addition, the work plan addendum shall explain the proposed final treatment and disposal of all material generated by the proposed treatment system.

The treatability study work plan addendum shall describe the technology to be tested, test objectives, test equipment or systems, experimental procedures, treatability conditions to be tested, measurements of performance, analytical methods, data management and analysis, health and safety procedures, and residual waste management. The DQOs for the treatability study shall also be documented. If pilot-scale treatability studies are to be done, the treatability study work plan addendum shall describe pilot plant installation and startup, pilot plant operation and maintenance procedures, and operating conditions to be tested. If testing is to be performed off-site, the addendum shall address permitting requirements. The addendum shall include a proposed schedule for performing the treatability study, with specific dates for each task and subtask (including anticipated EPA review periods). Key milestones for which

completion dates should be specified include procurement of subcontractors, sample collection, sample analysis and preparation of the treatability study report.

8.3 Conduct Treatability Studies (Optional)

The contractor shall conduct the treatability study in accordance with the approved treatability study addendums to the RI/FS work plan, QAPP, and HASP, to determine whether the remediation technology (or vendor of the technology) can achieve the required performance standards.

The following activities are required as part of the performance of the treatability study and pilot testing:

- Procure Test Facility and Equipment. The contractor shall procure the subcontractors, test facility and equipment necessary to perform the tests.
- Test and Operate Equipment. The contractor shall test the equipment to ensure proper operation, and operate or oversee operation of the equipment during the testing.
- Retrieve Sample for Testing. The contractor shall collect samples for testing as specified in the treatability study work plan addendum.
- Perform Laboratory Analysis. The contractor shall establish a field laboratory to facilitate fast turnaround analysis of test samples, or if necessary, shall procure outside laboratory services to analyze the test samples and evaluate test results.
- Characterize and dispose of residual wastes.

8.4 Treatability Study Report (Optional)

The contractor shall prepare a treatability study evaluation report describing the performance of the technology. The study results shall clearly describe the performance of the technology or vendor in comparison with the performance standards established for the site. The report shall also evaluate the treatment technology's effectiveness, implementability, cost, and final results as compared with the predicted results. The report shall evaluate full-scale application of the technology, including a sensitivity analysis identifying the key parameters affecting full-scale operation.

Task 9 Remedial Investigation Report

The contractor shall prepare a Remedial Investigation (RI) report that accurately establishes site characteristics such as the contaminated media, the extent of and movement of contamination, the physical boundaries of the contamination, and the potential sources of contamination. Pursuant to this objective, the contractor shall obtain only the minimum essential amount of detailed data necessary to determine these parameters for the key contaminants. The contractor must select the key contaminants based on their persistence and mobility in the environment and their degree of hazard. The contractor shall evaluate the key contaminants identified for receptor exposure and prepare an estimate of the key contaminant levels reaching human or environmental receptors. The contractor shall use existing standards and guidelines such as drinking water standards, water quality criteria, and other criteria accepted by EPA as appropriate for the condition, to evaluate effects on human receptors that may be exposed to the key contaminants above appropriate standards or guidelines. The RI must be consistent with the baseline human health risk assessment.

The contractor shall prepare the RI report in accordance with the *"Guidance for Conducting Remedial Investigations/Feasibility Studies under CERCLA,"* OSWER Directive 9355.3-01, October 1988, and *"Guidance for Data Usability in Risk Assessment, Parts A and B"* (EPA 9285.7-09A, April 1992 and 9285.7-09B, May 1992). The EPA WAM shall specify the format for the report if Region 2-specific requirements or other special requirements are called for.

9.1 Draft Remedial Investigation Report

The contractor shall prepare a draft Remedial Investigation report in accordance with the above guidance and the schedule in the approved final RI/FS work plan. An outline of the structure for the RI report and the subject areas and material to be covered is as follows:

1) Executive Summary

2) Introduction

- a) Purpose of the report
- b) Site background
 - i) Site description
 - ii) Site history
 - iii) Previous investigations
 - iv) Previous emergency or interim actions
 - v) Report organization

3) Study Area Investigation

- a) Covers field activities associated with site characterization, including as appropriate physical and chemical monitoring of the following:
 - i) Surface features (e.g., topographic mapping, natural and manmade features)
 - ii) Contaminant source investigations
 - iii) Meteorological investigations
 - iv) Surface water and sediment investigations
 - v) Geological investigations
 - vi) Soil and vadose zone investigations
 - vii) Groundwater investigations
 - viii) Human populations surveys
 - ix) Ecological investigations
 - x) Vapor Intrusion sampling (indoor air and subslab soil gas)
- b) Technical memoranda documenting field activities should be summarized in this chapter and may be included in an appendix to the report.

4) Physical Characteristics of the Study Area

- a) Covers the results of field activities to determine physical characteristics, including the following, as applicable:
 - i) Surface features
 - ii) Meteorology
 - iii) Surface water hydrology
 - iv) Geology
 - v) Soils
 - vi) Hydrogeology
 - vii) Demography and land use
 - viii) Ecology

5) Nature and Extent of Contamination *(Note: EPA must approve the screening values used for determining the nature and extent of contamination prior to submittal of the draft Remedial Investigation report.)*

- a) Presentation of the results of site characterization, both natural and chemical components and contaminants, as applicable, in the following media:
 - i) Sources (lagoons, sludges, tanks)
 - ii) Soils and vadose zone
 - iii) Groundwater
 - iv) Surface water and sediments
 - v) Air
 - vi) Subsurface gases

6) Contaminant Fate and Transport

- a) Potential routes of migration (e.g., air, groundwater, soils)
- b) Contaminant persistence: Describe estimated persistence in the study area environment and physical, chemical, and/or biological factors of importance for the media of interest, as applicable.
- c) Contaminant Migration
 - i) Discuss factors affecting contaminant migration for the media of interest (e.g., sorption onto soils, solubility in water, movement of groundwater, etc.)
 - ii) Discuss modeling methods and results, as applicable

7) Baseline Risk Assessment

- a) Human health risk assessment
 - i) Hazard identification
 - ii) Exposure assessment
 - iii) Toxicity assessment
 - iv) Risk characterization/uncertainty discussion
- b) Environmental evaluation

8) Summary

- a) Nature and extent of contamination
- b) Fate and transport
- c) Risk assessment

9) Conclusions

- a) Data limitations and recommendations for future work
- b) Recommended remedial action objectives

10) References

11) Tables and Figures

12) Appendices (including log books, soil boring logs, test pit/trenching logs, monitoring well construction diagrams, private and public well records, analytical data and QA/QC evaluation results)

9.2 Final Remedial Investigation Report

The contractor shall submit the final groundwater Remedial Investigation report incorporating all EPA review comments.

Task 10 Remedial Alternatives Screening

This task covers the development of appropriate remedial alternatives that will undergo full evaluation. The alternatives are to encompass a range, including innovative treatment technologies, consistent with the regulations outlined in the National Contingency Plan (NCP), 40 CFR Part 300, the “*Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA*” (OSWER Directive 9355.3-01, October 1998), and other applicable OSWER directives, policies and guidance (including “Considerations in Ground Water Remediation at Superfund Sites,” 9355.4-03, October 18, 1989, and “Considerations in Ground Water Remediation at Superfund Sites - Update,” 9283.1-06, May 27, 1992), as referenced in www.epa.gov/superfund/policy/remedy/sfremedy/remedies.htm and www.epa.gov/superfund/policy/sfremedy/rifs.overview.htm.

The contractor shall investigate only those hazardous waste management alternatives that will remediate or control contaminated media (soil, surface water, groundwater, sediments) at the site, as determined necessary in the RI to provide adequate protection of human health and the environment. The potential alternatives shall encompass a range of alternatives in which treatment is used to reduce the toxicity, mobility, or volume of wastes but vary in the degree to which long-term management of residuals or untreated waste is required, and shall include one or more alternatives involving containment with little or no treatment as well as a no-action alternative.

10.1 Technical Memorandum

The contractor shall prepare a draft technical memorandum presenting the potential alternatives and including the following information:

- *Establish Remedial Action Objectives.* Based on existing information, the contractor shall identify site-specific remedial action objectives that should be developed to protect human health and the environment. The objectives shall specify the contaminants and media of concern, the exposure routes and receptors, and an acceptable contaminant level or range of levels for each exposure route (i.e., preliminary remediation goals).
- *Establish General Response Actions.* The contractor shall develop general response actions for each medium of interest by defining contaminant treatment, excavation, pumping, or other actions, singly or in combination, to satisfy remedial action objectives. The response actions shall take into account requirements for protectiveness as identified in the remedial action objectives as well as the chemical and physical characteristics of the site.
- *Identify & Screen Applicable Remedial Technologies.* The contractor shall identify and screen technologies based on the general response actions developed. The contractor shall identify and screen hazardous waste treatment technologies in order to ensure that only those technologies applicable to the contaminants present, their physical matrix, and other site characteristics will be considered. This screening will be based primarily on a technology's ability to address the contaminants at the site effectively, but will also take into account that technology's implementability and cost. The contractor shall select representative process options, as appropriate, to carry forward into alternative development. The contractor shall identify the need for treatability testing for those technologies that are probable candidates for consideration during the detailed analysis.
- Develop Remedial Alternatives in accordance with NCP.
- *Screen Remedial Alternatives for Effectiveness, Implementability, and Cost.* The contractor shall screen alternatives to identify the potential technologies or process options that will be combined into media-specific or site-wide alternatives. The contractor shall define the developed alternatives with respect to the size and configuration of the representative process options; time for remediation; rates of flow or treatment; spatial requirements; distances for disposal; and required permits, imposed limitations and other factors necessary to evaluate the alternatives. If many distinct, viable options are available and developed, the contractor shall screen the alternatives that will undergo the detailed analysis in order to provide the

most promising process options. The contractor shall screen these alternatives on a general basis with respect to their effectiveness, implementability, and cost.

10.2 Final Technical Memorandum

The contractor shall incorporate EPA's review comments on the draft technical memorandum into the draft Feasibility Study report prepared under Subtask 12.1. The contractor shall not submit a separate final technical memorandum for the sections of the FS report covered in Task 10.

Task 11 Remedial Alternatives Evaluation

This task covers efforts associated with the assessment of individual alternatives against each of the nine current evaluation criteria and a comparative analysis of all options against the evaluation criteria. The analysis shall be consistent with the National Contingency Plan (NCP), 40 CFR Part 300 and shall consider the "*Guidance for Conducting Remedial Investigation and Feasibility Studies under CERCLA*" (OSWER Directive 9355.3-01, October 1988) and other pertinent OSWER guidance. EPA will make the determination regarding final selection of the remedial alternative.

The nine criteria the contractor shall employ in evaluation of remedial alternatives are:

- Overall protection of human health and the environment
- Compliance with ARARs
- Long-term effectiveness and permanence
- Reduction in toxicity, mobility or volume through treatment
- Short-term effectiveness
- Implementability - technical and administrative
- Cost
- Commonwealth acceptance
- Community acceptance

11.1 Technical Memorandum

The contractor shall prepare a technical memorandum that covers the following: (1) a technical description of each alternative that outlines the waste management strategy involved and identifies the key ARARs associated with each alternative; and (2) a discussion that profiles the performance of that alternative with respect to each of the evaluation criteria. The contractor shall provide a table summarizing the results of this analysis. After presentation of the complete analysis of each individual alternative, the contractor shall compare and contrast the alternatives to one another with respect to each of the evaluation criteria.

11.2 Final Technical Memorandum

The contractor shall incorporate EPA's review comments on the draft technical memorandum into the draft Feasibility Study report prepared under Subtask 12.1. The contractor shall not submit a separate final technical memorandum for the sections of the FS report covered in Task 11.

Task 12 Feasibility Study Report

The contractor shall prepare a Feasibility Study (FS) report consisting of a detailed analysis of alternatives and a cost-effectiveness analysis in accordance with the National Contingency Plan (NCP), 40 CFR Part 300, and current EPA feasibility study guidance.

12.1 Draft Feasibility Study Report

The contractor shall submit a draft Feasibility Study report in accordance with the performance schedule in the approved RI/FS work plan. To expedite the completion of the report, the contractor shall submit draft chapters of the report to the EPA WAM as they are completed. The FS report shall contain the following:

- Feasibility Study objectives
- Remedial objectives
- General response actions
- Identification and screening of remedial technologies
- Description of remedial alternatives
- Detailed analysis of remedial alternatives
- Summary and conclusions

The contractor's technical feasibility considerations shall address in detail any problems that may prevent a remedial alternative from mitigating site problems. Accordingly, the contractor must present the technical feasibility of each remedial alternative considering the site characteristics from the RI. The contractor shall also address the reliability (operation over time), safety, and operation and maintenance of each alternative, the ease with which the alternative can be implemented, and the time needed for implementation.

12.2 Final Feasibility Study Report

After EPA's review of the draft Feasibility Study report (which will incorporate the EPA review comments on the technical memoranda prepared under Subtasks 10.1 and 11.1 above), the contractor shall submit the final FS report incorporating all EPA review comments.

Task 13 Post RI/FS Support

The contractor shall provide technical support required for preparation of the Record of Decision for the site, excluding the community relations activities addressed in Task 2 of this statement of work. The contractor's support shall cover the following activities:

- Attendance at public meetings, briefings & technical meetings to provide site updates.
- Review of presentation materials.
- Technical support for presentation of draft and final Responsiveness Summary, Proposed Plan, and Record of Decision.
- Preparation and review of draft and a final Feasibility Study addendum (as required), based on the final ROD adopted for this site, covering issues arising after finalization of the RI/FS and supporting documents.

Task 14 Work Assignment Closeout

Upon formal notification from EPA that the technical work under this work assignment is complete, the contractor shall perform the necessary activities to close out this work assignment in accordance with contract requirements. After work assignment closeout activities have been completed, the contractor shall retain its work assignment files in accordance with Clause H.38, "Retention and Availability of Contractor Files," of Contract EP-W-09-002.

14.1 Document Indexing

At the conclusion of this work assignment, the contractor shall organize all work assignment files in its possession and provide a file index to the Project Officer. The contractor shall submit this file index with the long-term storage submittal required under Task 14.2. This file index shall list all final deliverables, work assignment amendments, and working files that may need to be accessed to provide information concerning why certain technical decisions

were made. The file index shall reference the work assignment number and site/project name in a heading at the top of each page. The index shall be sorted chronologically by date (from earliest to latest) and shall include brief descriptions/listings of the subject of each document, the person who sent the document and the recipients of the document.

14.2 Document Retention/Conversion

The contractors shall convert all relevant paper files into a long-term storage electronic format (compact disks or DVDs). The contractor shall deliver the storage media to the Project Officer within 45 days after EPA notification that the work assignment is complete.

Attachment 1
Summary of Major Submittals for Remedial Investigation/Feasibility Study
Pierson's Creek Site

TASK	DELIVERABLE	Number of Copies	DUE DATE (calendar days)
1.2	Scoping Meeting Minutes	3	5 days after scoping meeting
1.4	Draft RI/FS Work Plan and Budget	4	45 days after scoping meeting
1.5	Final RI/FS Work Plan and Budget	4	15 days after conclusion of negotiations
1.7	Draft Quality Assurance Project Plan (QAPP)	3	15 days after receipt of EPA review comments on draft RI/FS work plan
1.7	Final Quality Assurance Project Plan (QAPP)	3	15 days after receipt of EPA review comments on draft QAPP
1.8	Draft Health and Safety Plan (HASP)	3	15 days after receipt of EPA review comments on draft RI/FS work plan; to be submitted with draft QAPP
1.8	Final Health and Safety Plan (HASP)	3	15 days after receipt of EPA review comments on draft HASP; to be submitted with final QAPP
1.10	Meeting Minutes	3	5 days after each meeting
1.13	Pathway Analysis Report	2	TBD as finalized in approved work plan performance schedule
2.1	Community Interview Questions	3	TBD as finalized in approved work plan performance schedule
2.2	Draft Community Relations Plan	3	TBD as finalized in approved work plan performance schedule
2.2	Final Community Relations Plan	3	14 days after receipt of EPA review comments on draft CRP
2.3	Public Meeting Transcripts	2	14 days after each public meeting
2.4	Fact Sheets	2	10 days before each public meeting
2.6	Public Notices	2	7 days before each public meeting
2.8	Site Mailing List	3	14 days after approval of final CRP; updates 7 days after each public meeting
2.9	Responsiveness Summary Support	3	21 days after public meeting
5.3	Data Validation Report	3	21 days after validation of all analytical data
6.3	Modeling Assessment Report	3	TBD upon implementation into this work assignment
6.4	Data Evaluation Report	5	TBD as finalized in approved work plan performance schedule

Attachment 1
Summary of Major Submittals for Remedial Investigation/Feasibility Study
Pierson's Creek Site

TASK	DELIVERABLE	Number of Copies	DUE DATE (calendar days)
7.1	Draft Baseline Human Health Risk Assessment Report	3	30 days after approval of Pathway Analysis Report
7.1	Final Baseline Human Health Risk Assessment Report	3	14 days after receipt of EPA review comments on draft HHRA
7.2	Screening-Level Ecological Risk Assessment Report	3	45 days after completion of field investigation
7.2	Draft Baseline Ecological Risk Assessment Report	TBD	TBD as finalized in approved work plan performance schedule
7.2	Final Baseline Ecological Risk Assessment Report	TBD	TBD as finalized in approved work plan performance schedule
8.1	Results of Treatability Literature Search	2	TBD as finalized in approved work plan performance schedule
8.2	Draft Treatability Study Work Plan Addendum	3	TBD upon implementation into this work assignment
8.2	Final Treatability Study Work Plan Addendum	3	TBD upon implementation into this work assignment
8.4	Treatability Study Report	3	TBD upon implementation into this work assignment
9.1	Draft Remedial Investigation (RI) Report	6	90 days after completion of field investigation
9.2	Final Remedial Investigation (RI) Report	6	30 days after receipt of EPA review comments
10.1	Draft Remedial Alternatives Technical Memorandum	6	TBD as finalized in approved work plan performance schedule
11.1	Draft Remedial Alternatives Evaluation Memorandum	6	TBD as finalized in approved work plan performance schedule
12.1	Draft Feasibility Study Report	6	45 days after submission of Remedial Alternatives Evaluation Memorandum
12.2	Final Feasibility Study Report	6	30 days after receipt of EPA review comments
14.2	Document Retention/Conversion	3	Within 60 days after EPA notification of WA completion

ATTACHMENT 2 “GREEN REMEDIATION” PRACTICES

This attachment describes EPA Region 2’s current basic guidelines for the contractor’s evaluation and implementation of “Green Remediation” practices in the performance of remedial activities under work assignments issued for this contract. In the performance of these remedial activities, the contractor shall, to the extent practicable, explore and evaluate the use of:

Clean Air, through the use of cleaner technology and engines, cleaner fuel and cleaner diesel control technology on all diesel equipment used at sites during the remedial work. Clean diesel technologies are preferred, and alternative fuels such as biodiesel or natural gas-powered vehicles should also be considered. The contractor shall use alternative fuels, of at least a B20 blend or higher, on all on-site diesel equipment where these fuels are available within a reasonable distance from the site. The contractor shall employ the most efficient emission control technology for reducing particulate matter (PM) emissions on non-road and on-road diesel powered equipment used at a site. The contractor shall use cleaner engines, which include non-road engines meeting Tier II or cleaner standards and on-road engines meeting 2004 “On-Highway Heavy Duty Engine Emissions Standards” or cleaner.

Renewable Energy Sources, when conducting work related to selection of a cleanup remedy, constructing a cleanup remedy, and upgrading or otherwise improving an existing cleanup remedy. These sources of renewable energy can include solar, wind, and biofuels. Examples of renewable energy technologies include photovoltaic panels, wind turbines, digesters, gasifiers, and microturbines. As part of evaluating renewable energy sources and technologies, the contractor shall perform cost analyses that compare the energy costs from renewable sources to costs from traditional electricity sources provided by local utilities, over the expected life of the cleanup remedy. The contractor shall also perform evaluations of the emissions prevented as a result of using renewable energy sources versus traditional energy sources provided by local utilities. Finally, the contractor shall evaluate the costs of purchasing “green power” from organizations that offer such green power within the state where the site is located.

“GreenScapes,” as a cost-efficient and environmentally friendly solution for site landscaping. The “Greenscapes” concept has been designed to help preserve natural resources and prevent waste and pollution, and encourages practitioners to make more comprehensive decisions regarding waste generation and disposal and their associated cost and environmental effects on land, water, air, and energy use. “GreenScaping” encompasses a set of landscaping practices that can improve the health and appearance of the landscape at a site while protecting and preserving natural resources by reducing or eliminating the amount of waste materials involved in groundskeeping and the amount of water, pesticides, fuels, oils, and other materials used in landscaping. The practices involved in “GreenScaping” to reduce landscaping costs include: 1) **Reducing** the production of waste to promote more efficient use of materials; 2) **Reusing** materials in order to prolong their useful life and delay their recycling and/or final disposal; 3) **Recycling** to minimize waste generation by recovering and reprocessing usable products that might otherwise be disposed of ; and 4) **Rebuying** by making purchases that meet project needs but have a better overall effect on the environment, such as biobased, recycled content, and other environmentally preferable elements. (For more information on “GreenScapes,” see www.epa.gov/osw/partnerships/greenscapes/index.htm.)

Industrial Materials Reuse (IMR), involving reusing or recycling byproduct materials generated from industrial processes that can be used as substitutions for raw materials in the manufacture of consumer products, roads, bridges, buildings, and other construction projects. For example, nonhazardous industrial materials, such as coal ash, foundry sand, construction and demolition materials, slag, and gypsum, are valuable products of industrial processes that can be recycled in a variety of diverse applications. These materials have many of the same chemical and physical properties as the virgin materials they replace, and in many cases can even improve the quality of a product. Putting these commodities into productive use can save resources and energy and reduce greenhouse gas emissions. As such, the reuse and recycling of industrial materials is preferred when applicable, and may even present opportunities for revenue generation to offset remedial costs. (For more information on Industrial Materials Reuse, see www.epa.gov/osw/conserve/rrr/imr/index.htm.)

Attachment 3

EPA Region 2 Green Site Assessment and Remediation Checklist

In accordance with EPA's strategic plan for compliance and environmental stewardship, the Agency strives for cleanup programs that use natural resources and energy efficiently, reduce negative impacts on the environment, minimize or eliminate pollution at its source, and reduce waste to the greatest extent possible. The EPA Region 2 Superfund Program supports the adoption of "green site assessment and remediation," which can be defined as the practice of considering all environmental effects of remedy selection and implementation, and incorporating strategies to maximize the net environmental benefit of cleanup actions. **1 This** definition encompasses each phase of a project, from investigation through remediation and restoration. Opportunities to green a project exist through consideration of the following key variables.**2**

- _ Water Use
- _ Land Use
- _ Energy Use
- _ Air Emissions, Including Greenhouse Gas Emissions
- _ Land Use/Ecosystem Impact
- _ Materials Use and Waste Produced
- _ Long-term Maintenance

An optimal phase in which to start considering these actions is during the Remedial Investigation/ Feasibility Study (RI/FS) phase of a cleanup. Best practices of green remediation can be incorporated throughout the RI/FS phase, and, to maximize sustainability, cleanup and reuse options should be considered early during the planning process, enabling best practices to carry forward to cleanup activities, redevelopment activities, and ultimate land reuse. Incorporation of green remediation strategies into cleanup procurement documents and site management plans helps to open the door for best practices in the field. In accordance with federal procurement policy, selection of cleanup equipment and services must meet a project's performance and cost requirements, while giving preference to green products and providers.**3, 4**

Best practices of green remediation help ensure that day-to-day operations during all cleanup phases maximize opportunities to preserve and conserve natural resources, while achieving the cleanup's mission of protecting human health and the environment. Each site should incorporate practices addressing core elements of green remediation, with periodic review and update as new opportunities arise. An adaptive approach to managing all phases of a site cleanup enables the site to transition directly into long-term stewardship status. Each site should outline site-specific procedures to, among other things:

- _ Reduce air emissions (including greenhouse gas emissions) and energy use,
- _ Demonstrate water-quality preservation and resource conservation,
- _ Establish near-term improvements to the ecosystem that carry forward into site revitalization, and
- _ Reduce material consumption and waste generation.

This checklist is designed to assist EPA contractors in planning for and implementing green practices during the RI/FS.

***EPA Region 2
Green Site Assessment and Remediation Checklist
Superfund Remedial Investigation/Feasibility Study Activities***

ADMINISTRATIVE

_ incorporate green remediation practices into the contracting process, as possible

Require contractors follow Region 2's Clean and Green Policy
Suggest contractors consider green remediation best practices during RI/FS

_ Consider future use at beginning of project to guide investigation and remedy selection

Future use may guide type of sampling required; ensure that it is most efficient and green method
Encourage development of renewable energy production facilities on contaminated lands

_ Reporting and Communication

GENERAL ON-SITE OPERATIONS

_ Encourage sustainable practices in trailers/buildings

Utilize existing building for field office if possible
Situating trailer to benefit from existing vegetation
Utilize "green" trailers if possible **6, 7**
Maintain heating and cooling systems
Enhance indoor environmental quality **8**
Optimize operational and maintenance practices to increase efficiency **9**

**_ Minimize non-renewable energy consumption
10, 11, 12, 13, 14**

Purchase renewable energy supply through local utility programs
Purchase Renewable Energy Credits/Certificates (RECs or Green Tags)
Research potential for Green Pricing Programs and Power Purchase Agreements

_ Use environmentally preferable products

Compact Fluorescent Lights (CFL)
Environmentally friendly electronics (e.g., ENERGY STAR) **15**
Require the use of innovative approaches during the RI
Interim and final documents should be submitted in digital rather than hardcopy format, unless otherwise requested by EPA, in an effort to save paper. This is especially applicable to voluminous data reports, such as the validation metadata for laboratory analyses.
Utilize renewable Onsite Generation Systems, e.g., solar photovoltaic (PV), wind turbines, and biomass combustion.
Require contractors to follow guidelines found in the NEDC Model Contract Specification.
Diesel Emission Controls in Construction Projects **5**
Recycled products
Avoid use of pesticides where feasible and follow EPA's Integrated Pest Management Practices **16**

***EPA Region 2
Green Site Assessment and Remediation Checklist
Superfund Remedial Investigation/Feasibility Study Activities***

_ Encourage sustainable practices by individuals

Minimize waste **17**
Reuse or recycle waste
Protect and conserve water
Use alternative fuel vehicles (hybrid-electric, biodiesel, ultra-low sulfur diesel) **18**
Carpool **19**
Schedule activities efficiently so as to minimize travel to and from the site

FIELD INVESTIGATIONS

_ Mobilization

Use fuel-efficient / alternative fuel vehicles and equipment **18**
Use existing roadways where available
Provide for erosion and sediment control to minimize runoff into environmentally sensitive areas
Use recycled material for building roadways **21, 22, 23**
Revegetate areas if necessary

_ Demolition of on-site structures

Minimize demolition of structures and buildings
Recycle demolition and construction material as possible **21, 22, 23**

_ Field Screening

Use non-invasive technologies where possible for subsurface characterization to minimize wastes (Electrical Resistivity Tomography, Borehole Radar Tomography, Ground-Penetrating Radar, Seismic Refraction/Reflection, Electromagnetic Survey). **24, 25, 26**

Incorporate systematic planning, dynamic work strategies, and real-time measurements into work plans (TRIAD) to promote efficiency in remedial investigations. **27**

Avoid environmentally sensitive areas and cutting native trees/vegetation when placing trailers and storage areas, and while building access

Use diesel engines that meet the most stringent EPA on-road emissions standards available at the time of project's implementation or utilize EPA or CARB verified emission control technology to reduce PM emissions by a minimum of 85% when technologically feasible on all on-road diesel engines. **20**

Minimize number of field mobilizations
Minimize number of samples sent to laboratories
Use of mobile laboratories
Use of alternate fuel sources

Drilling

Have idle reduction policy and idle reduction devices installed on machinery **28**
Use ultra-low sulfur diesel and/or fuel-grade biodiesel as fuel **29, 30, 31, 32, 33, 34**

***EPA Region 2
Green Site Assessment and Remediation Checklist
Superfund Remedial Investigation/Feasibility Study Activities***

Engine Maintenance 36

- Perform routine inspections
- Conduct preventative maintenance
- Give problems immediate attention
- Perform routine cleaning
- Use environmentally friendly lubricants if applicable
- Decontamination
- Place decontamination station away from environmentally sensitive areas
- Use secondary containment to avoid cross contamination
- Use steam cleaning where allowed by federal/state/or local regulations
- Use non-phosphate detergents

Well Installation

- Use recycled well materials where possible (well caps, etc.)
- Manage use of cement/grout to minimize waste produced
- Ensure wells are properly developed to increase efficiency

Waste Management

- Use direct-push rig if applicable to minimize drill cuttings
- Place drill cuttings back in boring if applicable
- Store drill cuttings away from surface water bodies to prevent cross-contamination
- Dispose of drill cuttings at recycling facility if possible
- Use diesel engines that meet the most stringent EPA Tier non-road emissions standards available at the time of project's implementation or utilize EPA or CARB verified emissions by a minimum of 85% when technologically feasible on all non-road diesel vehicles. **35**

_ Sampling

General practices

- Use environmentally friendly PPE if applicable
- Use recycled laboratory containers if applicable
- Use laboratories which promote green chemistry
- Schedule sampling to minimize field visits and shipping
- Consider all data needs for any potential future uses

Soil Sampling

- Use sampling methods that require smaller amounts of soil to minimize waste
- Dispose of waste properly to avoid cross contamination
- Recycle soil waste if available

Groundwater sampling

- Use passive groundwater samplers where applicable **37, 38**
- Use eco-friendly bailers **39**
- Use dedicated equipment to minimize waste and cross-contamination
- Use remote data collection to minimize mobilizations
- Treat and recycle purged water on-site

Surface Water sampling

- Choose sampling locations that minimize ecological disturbance
- Use dedicated sampling equipment to minimize waste and cross-contamination

***EPA Region 2
Green Site Assessment and Remediation Checklist
Superfund Remedial Investigation/Feasibility Study Activities***

TREATABILITY INVESTIGATIONS/FEASIBILITY STUDIES

- _ Treatability Investigations (Bench-Scale, Pilot-Scale)**
- _ Analysis of Alternatives in the FS and Green Remediation Best Management Practices (BMPs)**

Evaluate "net environmental benefit as part of the nine criteria review process **2**

Decontaminate equipment away from surface water body to avoid contamination due to runoff

The evaluation of laboratory sub-contractors should include their commitment to green chemistry. The purpose is to reduce the amount and toxicity of chemicals used and required to be disposed. **40, 41**

Consider future use of site in determining the short and long-term effectiveness of the remedy

If one remedy has a vendor within the state but another remedy will require shipping equipment from another region, then the first remedy is more easily implementable AND may have a lower environmental footprint (through reduced transportation).

Evaluate energy efficiency (amount of energy necessary to remove one pound of contaminant) of each alternative over the projected lifecycle of the alternative.

Evaluate water intensity (amount of water necessary to remove one pound of contamination) **2**

Focus on minimizing high quality fresh water use

Assess the use of reclaimed water where applicable, e.g., for irrigation

Use native vegetation that requires little or no irrigation

Assess the best estimate of the cost of the energy projected out 30 years

Evaluate water intensity (amount of water necessary to remove one pound of contamination) **2**

Focus on minimizing high quality fresh water use

Assess the use of reclaimed water where applicable, e.g., for irrigation

Use native vegetation that requires little or no irrigation

Consider Green Remediation Best Management Practices for site restoration

Low-Impact Development (LID) - stormwater management **43**

Ecorestoration (increased wildlife habitat, increased carbon sequestration, protection of water resources, etc).

Greenscaping **44**

Encourage development of renewable energy production facilities on contaminated lands

Evaluate soil intensity of each alternative (amount of soil necessary to be displaced or disturbed to remove one pound of contaminant) **2, 42**

Incorporate green remediation best practices for each remedy considered as part of cost evaluation

Incorporate green remediation best practices for each remedy considered as part of cost evaluation

Analyze the feasibility of alternate energy sources for the required energy, e.g., solar, wind, biodiesel, etc.

Evaluate low-energy remedial alternatives, e.g., MNA, phytoremediation, micro-bioremediation, etc.; low energy use will be one of the factors weighed against the projected time for remediation

Minimize use of fertilizer, pesticides, herbicides, and other chemicals to prevent nutrient loading and toxicity impacts to nearby water bodies

Evaluate material intensity of each alternative (amount of raw materials extracted, processed, or disposed for each pound of contaminant treated) **2**

Minimize use of fertilizer, pesticides, herbicides, and other chemicals to prevent nutrient loading and toxicity impacts to nearby water bodies

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EPA Region 2
Green Site Assessment and Remediation Checklist
Superfund Remedial Investigation/Feasibility Study Activities

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